

# Self-assembled heteropolymetallic complexes as MRI contrast agents

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For some decades now, MRI has set its place into molecular imaging where it is widely used as a diagnostic tool in various medical procedures. The great evolution of MRI was prompted by the use of contrast agents. In recent years, efforts have been directed towards the finding of contrast agents with improved characteristics such as increased efficiency and organ specificity<sup>1</sup>. Our approach in achieving such goals explores slowing down the rotational motion of the contrast agent by formation of large molecular weight supramolecular structures. A new promising class of these supramolecular structures are the so-called **metallostars**<sup>2</sup>. These are metal complexes built by self-assembly containing a central d-metal ion and peripheral lanthanide ions.

For the synthesis of the complexes, novel ditopic ligands were developed. These ligands contain a DTPA-derivative as a binding unit for the lanthanide ion and a catechol, a 8-hydroxyquinoline or a 1,10-phenantroline derivative as a binding unit for Fe(II)/Fe(III), Al(III) and Ga(III) ions.

Characterization was performed by ESI-MS, NMR, IR, UV-VIS and luminescence spectroscopy and all the data were consistent with the formation of supramolecular complexes.

In addition to contrasting properties we explored the use of these complexes as optical imaging agents. A complex with a central gadolinium(III) ion and peripheral Ru(II) ions was synthesized from a 1,10-phenantroline derivative (Figure 1). The complex was also fully characterized and luminescence showed clear emission from the  $Ru^{II}(bipy)_2$  part which makes the molecule a promising bimodal agent.

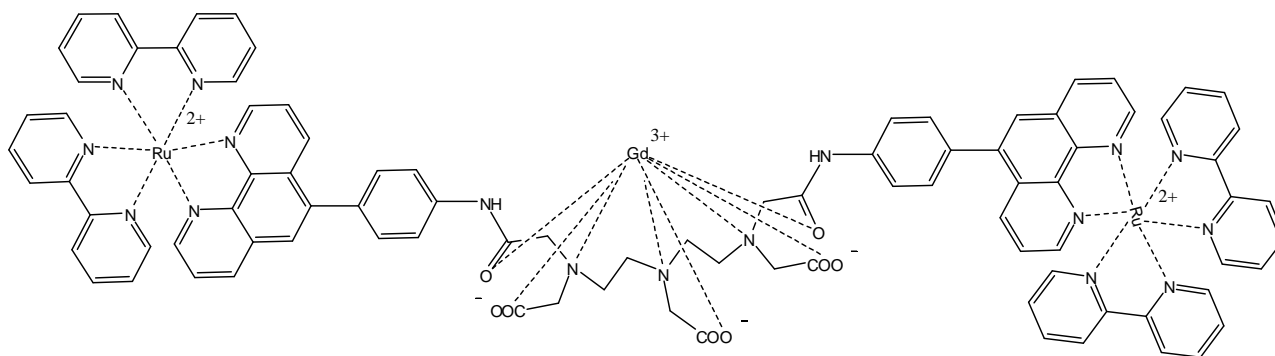


Figure 1: structure of  $[Ru(bipy)_2]_2Gd^{III}$  BisphenantrolineDTPA

In conclusion a series of new promising metallostars compounds that are also suitable for multimodal imaging were developed. Further studies towards the relaxivity, biodistribution and physico-chemical properties of the complexes are under way and are carried out in cooperation with the research group of Prof. Robert Muller (Université de Mons-Hainaut).